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(54) Title: OPTICAL SCANNING DEVICE

(57) Abstract: An optical scanning device for scanning an optical record carrier comprising an information layer. Crosstalk cancellation is provided using a phase modulating element (40, 140) for generating a non-rotationally-symmetric phase profile in a subsidiary radiation beam. The phase profile varies with an azimuthal angle measured about the optical axis of the beam portion, the phase profile varying such that successively different phases are introduced in at least five locations which are each at successive azimuthal angles (?????????) and each at a given radial distance from the optical axis, wherein the phase profile is such that the phases introduced, when taken in modulo  $2\pi$  form, successively cycle through 0 to  $2\pi$  at least twice, whereby the subsidiary beam spot is provided with an intensity distribution on the information layer which overlaps that of the side-lobe of the main beam spot.

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# INTERNATIONAL SEARCH REPORT

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## A. CLASSIFICATION OF SUBJECT MATTER

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## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G11B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 349 592 A (ANDO HIDEO) 20 September 1994 (1994-09-20) column 6, line 27 - column 34, line 2; figures	1-13
A	US 5 838 502 A (KIM JIN YONG ET AL) 17 November 1998 (1998-11-17) column 6, line 1 - column 8, line 61; figures	1, 13
A	US 6 373 808 B1 (JEONG SEONG YUN) 16 April 2002 (2002-04-16) column 4, line 19 - column 6, line 3; figures	1, 13
A	EP 0 735 527 A (MATSUSHITA ELECTRIC IND CO LTD) 2 October 1996 (1996-10-02) page 8, line 36 - page 18, line 35; figures	1, 13

☐ Further documents are listed in the continuation of box C.

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Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5349592	A	20-09-1994	JP	5241111 A	21-09-1993
			JP	3068340 B2	24-07-2000
			JP	5196896 A	06-08-1993
US 5838502	A	17-11-1998	JP	2801176 B2	21-09-1998
			JP	9274135 A	21-10-1997
US 6373808	B1	16-04-2002	NONE		
EP 0735527	A	02-10-1996	JP	7320295 A	08-12-1995
			DE	69519563 D1	11-01-2001
			DE	69519563 T2	05-04-2001
			EP	0735527 A1	02-10-1996
			KR	214046 B1	02-08-1999
			US	6185168 B1	06-02-2001
			US	6115345 A	05-09-2000